WHAT IS CLAIMED IS:

1.   A color separation table generation method of generating a color separation table used to separate an input color into a plurality of color agent colors,
5   comprising:

a first table generation step of generating color separation data on a first line that connects white and black points in the color separation table;

a second table generation step of generating
10   color separation data on a plurality of second lines each of which connects the white point and each of primary color points each expressed by one of the color agent colors and secondary color points each expressed by two of the color agent colors;

15   a third table generation step of generating color separation data on a plurality of third lines each of which connects each of the primary and secondary color points and the black point;

a fourth table generation step of generating
20   color separation data on a plurality of fourth lines each of which connects the primary and secondary color points; and

an interpolation step of generating color separation data at grid points inside a three-
25   dimensional color space by an interpolation process based on the color separation data on the first to fourth lines,

wherein the interpolation step includes a step of executing an interpolation process using a finite element method for each triangular plane specified on the color space.

5   2.   The method according to claim 1, wherein the interpolation step includes a step of executing an addition process of an interpolation result of a two-point interpolation process based on two sides of the triangular plane, and an interpolation result of the

10   finite element method.

3.   The method according to claim 1, wherein the finite element method in the interpolation step executes an interpolation process based on a change in color agent amount on one side of the triangular plane.

15   4.   The method according to claim 3, wherein the finite element method in the interpolation step executes an interpolation process based on a partial change in color agent amount on one side of the triangular plane.

20   5.   The method according to claim 2, wherein the finite element method in the interpolation step applies a finite element method interpolation method exclusively for a region where color agent amounts are present as a result of the two-point interpolation

25   process based on the two sides of the triangular plane.

6.   The method according to claim 1, wherein the interpolation step includes a step of controlling

interpolation result values based on the finite element

method for respective regions.

7.   The method according to claim 1, wherein the

interpolation step includes a step of classifying

5   changes in color agent amount on respective sides of

the triangular plane into a plurality of shapes,

setting an interpolation method on the basis of a

combination of the shapes of the sides of the

triangular plane, generating color separation data for

10   grid points on the triangular plane by the set

interpolation method, and setting an identical

interpolation method when the same shape is obtained by

inverting, rotating, or inverting and rotating the

sides of the triangular plane.

15   8.   An image forming apparatus for forming an image

using a plurality of color agents, comprising:

an input unit for inputting color image data;

a color separation unit for separating each of

colors indicated by the input color image data into the

20   plurality of color agent colors on the basis of a color

separation table generation by a method of claim 1; and

an image forming unit for forming a visible image

on the basis of the color image data separated into the

plurality of color agent colors.

25   9.   A color separation table generation method of

generating a color separation table used to separate an

input color into a plurality of color agent colors, comprising:

a step of decomposing, into a set of triangles, a space of an input color range specified by prescribed

5   points which specify outer edges of the input color range on a color space of the input color on the basis of color separation data at the prescribed points; and

a step of calculating color separation data corresponding to the color space for the entire range

10   of the input color by interpolating inner color separation data of each of the triangles,

wherein upon interpolating each triangle, when transition of a color separation data value forms an upward convex shape for one or three sides of the

15   triangle, interpolation is made by a finite element method using the side whose transition of the color separation data value forms an upward convex shape for one side, and a constant for the remaining two sides as boundary values.

20   10.   A computer program product that records a program for generating a color separation table used to separate an input color into a plurality of color agent colors, said program comprising:

a code of a first table generation step of

25   generating color separation data on a first line that connects white and black points in the color separation table;

a code of a second table generation step of generating color separation data on a plurality of second lines each of which connects the white point and each of primary color points each expressed by one of

5   the color agent colors and secondary color points each expressed by two of the color agent colors;

a code of a third table generation step of generating color separation data on a plurality of third lines each of which connects each of the primary

10   and secondary color points and the black point;

a code of a fourth table generation step of generating color separation data on a plurality of fourth lines each of which connects the primary and secondary color points; and

15   a code of an interpolation step of generating color separation data at grid points inside a three-dimensional color space by an interpolation process based on the color separation data on the first to fourth lines,

20   wherein the interpolation step includes a step of executing an interpolation process using a finite element method for each triangular plane specified on the color space.

11.   A computer program product that records a program

25   for generating a color separation table used to separate an input color into a plurality of color agent colors, said program comprising:

a code of a step of decomposing, into a set of
triangles, a space of an input color range specified by
prescribed points which specify outer edges of the
input color range on a color space of the input color
5   on the basis of color separation data at the prescribed
points; and

a code of a step of calculating color separation
data corresponding to the color space for the entire
range of the input color by interpolating inner color
10 separation data of each of the triangles,

wherein upon interpolating each triangle, when
transition of a color separation data value forms an
upward convex shape for one or three sides of the
triangle, interpolation is made by a finite element
15 method using the side whose transition of the color
separation data value forms an upward convex shape for
one side, and a constant for the remaining two sides as
boundary values.

12.   A color separation table generation apparatus for
20 generating a color separation table used to separate an
input color into a plurality of color agent colors,
said program comprising:

a first table generation unit for generating
color separation data on a first line that connects
25 white and black points in the color separation table;

a second table generation unit for generating
color separation data on a plurality of second lines

each of which connects the white point and each of

primary color points each expressed by one of the color

agent colors and secondary color points each expressed

by two of the color agent colors;

5   a third table generation unit for generating

color separation data on a plurality of third lines

each of which connects each of the primary and

secondary color points and the black point;

a fourth table generation unit for generating

10   color separation data on a plurality of fourth lines

each of which connects the primary and secondary color

points; and

an interpolation unit for generating color

separation data at grid points inside a three-

15   dimensional color space by an interpolation process

based on the color separation data on the first to

fourth lines,

wherein said interpolation unit executes an

interpolation process using a finite element method for

20   each triangular plane specified on the color space.